"On the Capacity and Residual Charge of Dielectrics as affected by Temperature and Time." By J. HOPKINSON, F.R.S., and E. WILSON. Received December 15, 1896,—Read January 28, 1897.

(Abstract.)

The major portion of the experiments described in the paper have been made on window glass and ice. It is shown that for long times residual charge diminishes with rise of temperature in the case of glass, but for short times it increases both for glass and ice. The capacity of glass when measured for ordinary durations of time, such as 1/100th to 1/10th second, increases much with rise of temperature, but when measured for short periods, such as $1/10^6$ second, it does not sensibly increase. The difference is shown to be due to the residual charge, which comes out between 1/50,000th second and 1/100th second. The capacity of ice when measured for periods of 1/100th to 1/10th second increases both with rise of temperature, and with increase of time, its value is of the order of 80, but when measured for periods such as $1/10^6$ second, its value is less than 3. The difference again is due to residual charge coming out during short times. In the case of glass, conductivity has been observed at fairly high temperatures and after short times of electrification; it is found that the conductivity after 1/50,000th second electrification is much greater than after 1/10,000th, but for longer times is sensibly constant. Thus a continuity is shown between the conduction in dielectrics which exhibit residual charge and deviation from Maxwell's law and ordinary electrolytes.

"On the Electrical Resistivity of Electrolytic Bismuth at Low Temperatures, and in Magnetic Fields." By JAMES DEWAR, M.A., LL.D., F.R.S., Fullerian Professor of Chemistry in the Royal Institution; and J. A. FLEMING, M.A., D.Sc., F.R.S., Professor of Electrical Engineering in University College, London. Received January 4,—Read January 28, 1897.

In a previous communication to the Royal Society we have pointed out the behaviour of electrolytically prepared bismuth when cooled to very low temperatures, and at the same time subjected to transverse magnetisation.* During the last summer we have extended these

* See 'Proc. Roy. Soc.,' vol. 60, p. 72, 1896. "On the Electrical Resistivity of Bismuth at the Temperature of Liquid Air," by James Dewar and J. A. Fleming. See also 'Phil. Mag.,' September, 1895, Dewar and Fleming "On the Variation in the Electrical Resistance of Bismuth when cooled to the Temperature of Solid Air."